Exhibit 12

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC, CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS, VERIZON CORPORATE SERVICES GROUP INC., T-MOBILE USA, INC., SPRINT LLC F/K/A SPRINT CORP., AND AT&T SERVICES, INC.,

Petitioners,

v.

Headwater Research LLC,

Patent Owner.

Case: IPR2024-00945

U.S. Patent No. 9,215,613
Issue Date: Dec. 15, 2015

Title: Wireless End-User Device with Differential Traffic Control Policy List Having Limited User Control

PETITION FOR *INTER PARTES* REVIEW

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CLAIM LISTING

[1.0]	1. A wireless end-user device, comprising:
[1.1]	a wireless wide area network (WWAN) modem to communicate data for Internet service activities between the device and at least one WWAN, when configured for and connected to the WWAN;
[1.2]	a wireless local area network (WLAN) modem to communicate data for Internet service activities between the device and at least one WLAN, when configured for and connected to the WLAN;
[1.3]	a non-transient memory to store
[1.3.1]	a differential traffic control policy list distinguishing between a first one or more applications resident on the device and a second one or more applications and/or services resident on the device, and
[1.3.2]	a differential traffic control policy applicable to at least some Internet service activities by or on behalf of the first one or more applications;
[1.4]	an interface to allow a user to augment the differential traffic control policy for the first one or more applications but not for the second one or more applications and/or services; and
[1.5]	one or more processors configured to
[1.5.1]	classify a wireless network to which the device currently connects in order to communicate data for Internet service activities as at least one of a plurality of network types that the device can connect with,
[1.5.2]	classify whether a particular application capable of both
[1.5.2.1]	interacting with the user in a user interface foreground of the device, and

[1.5.2.2]	at least some Internet service activities when not interacting with the user in the device user interface foreground,
[1.5.2.3]	is interacting with the user in the device user interface foreground, and
[1.6]	selectively allow or deny one or more Internet service activities by or on behalf of the particular application based on whether or not the particular application is one of the first one or more applications, the differential traffic control policy, including any applicable user augmentation of the differential traffic control policy, and the classifications performed by the one or more processors.
[2]	2. The wireless end-user device of claim 1, wherein based on the differential traffic control policy the one or more processors selectively deny one or more Internet service activities by or on behalf of the particular application when the particular application is one of the first one or more applications, the classified wireless network is a WWAN type, and the particular application is classified as not interacting with the user in the device user interface foreground.
[3]	3. The wireless end-user device of claim 2, wherein the one or more processors are further configured to override the selective denial of one or more Internet service activities by or on behalf of the particular application when the user has augmented the differential traffic control policy so as to indicate that Internet service activities are allowable when the classified wireless network is the WWAN type, and the particular application is classified as not interacting with the user in the device user interface foreground.
[4]	4. The wireless end-user device of claim 2, wherein based on the differential traffic control policy the one or more processors selectively allow one or more Internet service activities by or on behalf of the particular application when the particular application is one of the first one or more applications, the classified wireless network is the WWAN

	type, and the particular application is classified as interacting with the user in the device user interface foreground.
[5]	5. The wireless end-user device of claim 1, wherein based on the differential traffic control policy the one or more processors selectively allow one or more Internet service activities by or on behalf of a second particular application and/or service when the second particular application and/or service is one of the second one or more applications and/or services and the classified wireless network is the WWAN type.
[6]	6. The wireless end-user device of claim 1, wherein the one or more processors are configured to classify that the particular application is interacting with the user in the device user interface foreground when the user of the device is directly interacting with that application or perceiving any benefit from that application.
[7]	7. The wireless end-user device of claim 1, wherein the user interface is further to provide the user of the device with information regarding why the differential traffic control policy is applied to the particular application.
[8]	8. The wireless end-user device of claim 1, wherein the differential traffic control policy is part of a multimode profile having different policies for different ones of the network types.
[9]	9. The wireless end-user device of claim 8, wherein the one or more processors are further configured to select a traffic control policy from the multimode profile based at least in part on the classified wireless network type.
[10]	10. The wireless end-user device of claim 9, wherein the one or more processors are further configured to, when the classified wireless network type is at least one type of WLAN, select the traffic control policy from the multimode profile based at least in part on a type of network connection from the WLAN to the Internet.

[11]	11. The wireless end-user device of claim 1, wherein the plurality of network types include three or more of 2G, 3G, 4G, home, roaming, and WiFi.
[12]	12. The wireless end-user device of claim 1, the one or more processors further configured to receive an update to at least a portion of the differential traffic control policy list from a network element.
[13]	13. The wireless end-user device of claim 1, wherein the plurality of network types include a roaming WWAN type and a home WWAN type, and the one or more processors are to apply the differential traffic control policy to one of but not both of the roaming WWAN type and the home WWAN type.
[14]	14. The wireless end-user device of claim 1, wherein the plurality of network types include the WWAN type and a WLAN type, and the one or more processors are to apply the differential traffic control policy to one of but not both of the WWAN type and the WLAN type.
[15]	15. The wireless end-user device of claim 1, wherein the one or more processors are further configured to dynamically change the application of the differential traffic control policy based on a power state of the device.
[16]	16. The wireless end-user device of claim 1, wherein the one or more processors are further configured to dynamically change the application of the differential traffic control policy based on a device usage state.
[17]	17. The wireless end-user device of claim 1, wherein the one or more processors are further configured to dynamically change the application of the differential traffic control policy based on power control state changes for one or more of the modems.
[18]	18. The wireless end-user device of claim 1, wherein the differential traffic control policy defines that the first one or more applications can only access a first one of the network types during particular time windows.

[19]	19. The wireless end-user device of claim 1, wherein the one or more processors are configured to classify that the particular application is interacting with the user in the device user interface foreground based on a state of user interface priority for the application.
[20]	20. The wireless end-user device of claim 1, wherein the second one or more applications are not subject to a differential network access control that is applicable to the first one or more applications.
[21]	21. The wireless end-user device of claim 1, wherein the one or more processors are further configured to classify between: user applications; system applications, utilities, functions, or processes; and operating system application, utilities, functions, or processes.
[22]	22. The wireless end-user device of claim 1, wherein the second one or more applications or services comprises foreground services.
[23]	23. The wireless end-user device of claim 1, wherein selectively deny comprises intermittently block when the one or more Internet service activities are requested during selected time windows.
[24]	24. The wireless end-user device of claim 1, wherein the one or more processors are configured to prevent the first one or more applications from changing the power state of at least one of the modems, and to not prevent the second one or more applications from changing the power state of the same modem or modems.

LIST OF EXHIBITS

Exhibit #	***Description***
1001	U.S. Patent No. 9,215,613 ("'613 Patent")
1002	Select portions of prosecution history of the '613 Patent ("'613 File History")
1003	Declaration of Petitioner's Expert, Dr. Henry Houh ("Houh Declaration")
1004	U.S. Patent Publication No. 2006/0039354 A1 ("Rao")
1005	U.S. Patent Publication No. 2009/0207817 A1 ("Montemurro")
1006	U.S. Patent Publication No. 2009/0217065 A1 ("Araujo")
1007	U.S. Patent No. 5,987,611 ("Freund")
1008	Curriculum Vitae of Dr. Henry Houh
1009	*Mobile Network Evolution: GSM to UMTS*, CONNINGTECH (May 8, 2008, 12:26 pm), https://conningtech.wordpress.com/2008/05/08/mobile-network-evolution-gsm-to-umts/ (last visited May 23, 2024)
1010	Patent Owner's Preliminary Response, Samsung Electronics Co., Ltd. v. Headwater Research LLC, No. IPR2023-01462, Paper 6 (PTAB Jan. 4, 2024)
1011	U.S. Patent No. 8,000,715 ("Melpignano")
1012	Elizabeth Woyke, *World's most wired airports*, NBC News (Mar. 11, 2008, 10:02 am), https://www.nbcnews.com/id/wbna23391922 (last visited May 15, 2024)
1013	[reserved]
1014	U.S. Publication No. 2004/0123153 ("Wright")
1015	U.S. Publication No. 2006/0183461 ("Pearce")
1016	[reserved]
1017	[reserved]
1018	[reserved]
1019	U.S. Pat. No. 7,881,267 ("Crosswy")
1020	Eastern District of Texas Model Order Focusing on Claim and Prior Art Reduction

Exhibit #	***Description***
1021	Docket Control Order, Headwater Research LLC v Verizon Communications Inc., No. 2:23-cv-00352, ECF No. 40 (E.D. Tex. Oct. 24, 2023)

Petitioners request IPR of claims 1-24 of U.S. Patent 9,215,613.

I. STANDING

Petitioners are not barred or estopped from requesting IPR on these grounds.

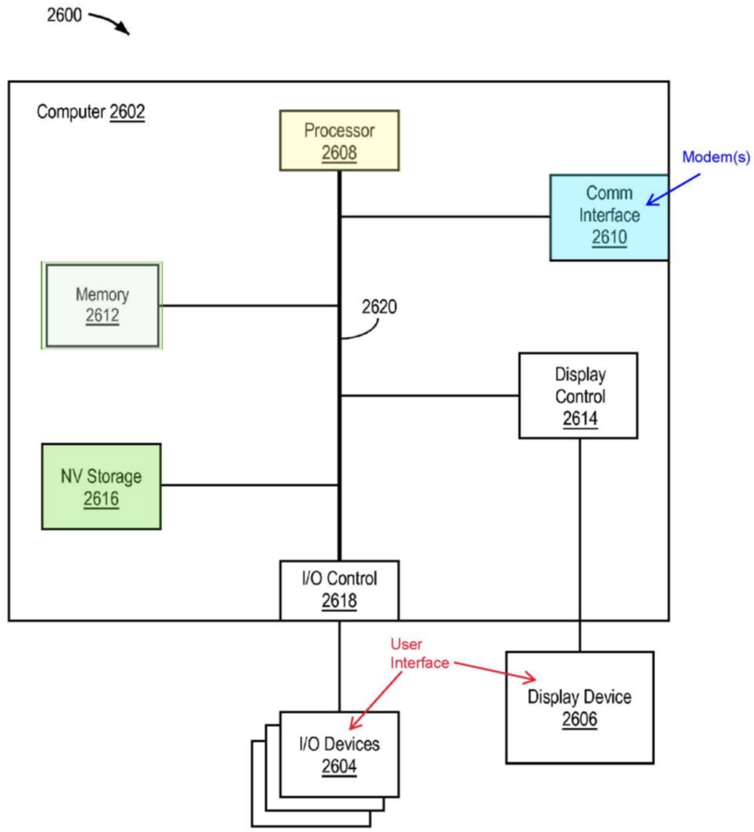
II. RELIEF REQUESTED

Grounds	
1	Rao in view of Montemurro and Freund renders obvious claims 1-14, 16, and 18-23
2	Rao in view of Montemurro, Freund, and Araujo renders obvious claims 15, 17, and 24

III. THE ’613 PATENT

A. Overview

The ’613 patent incorporates a hodge-podge of disclosures. The claims recite a “wireless end-user device” with the well-known structures of a processor (yellow), storage/memory (green), a user interface (red arrows), and modems for WWAN and WLAN communication (blue). EX-1001, 99:11-32, 105:51-106:25.



EX-1001, Fig. 26.[1]

The claimed processor: 1) classifies a network with which the device is communicating (WWAN or WLAN); (2) classifies whether applications are running in the device foreground; (3) controls the device's internet activities using a differential traffic control policy (rules); and (4) allows user augmentation of the policy. *See, e.g.*, *id.*, Claim 1. The claimed policy evaluates and applies criteria (e.g.,

[1] Unless otherwise noted, all annotations and emphases herein added.

the network used, whether an application is in the foreground) to allow or deny internet activity. *See, e.g.*, *id.*, 100:28-102:56, Fig. 27.

B. Prosecution History

The '613 claims were allowed without rejections. *See generally* EX-1002. The applicant submitted over 1,800 references to the Examiner without comment or any explanation of their relevance (or lack thereof). *Id*.

C. POSA

A POSA at the time of the alleged invention would have had at least a bachelor's degree in computer science, computer engineering, or a similar field, and approximately two years of industry or academic experience in a field related to computer software development and/or computer networking. EX-1003 ¶61. Work experience can substitute for education, and additional education can substitute for work experience. *Id.*

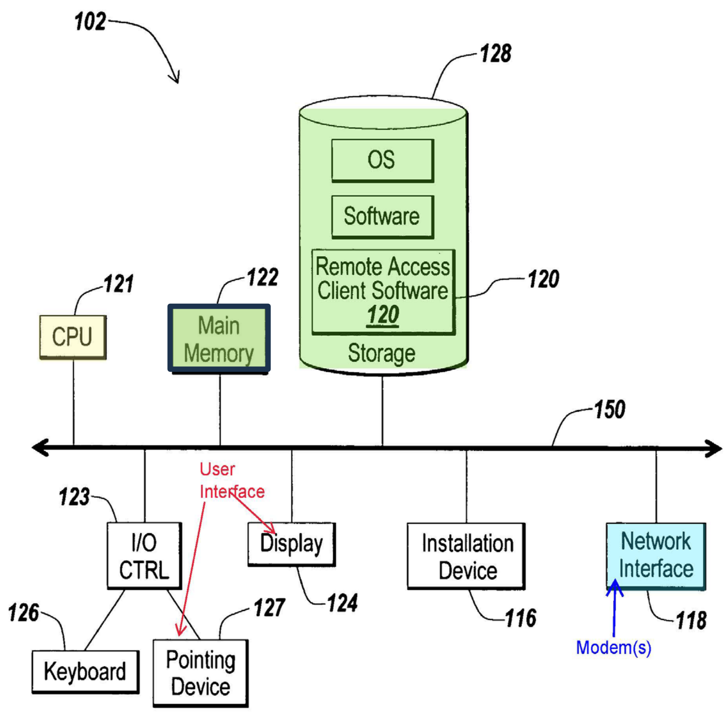
IV. Claim Construction

No terms require construction to resolve this Petition.

V. PRIOR ART

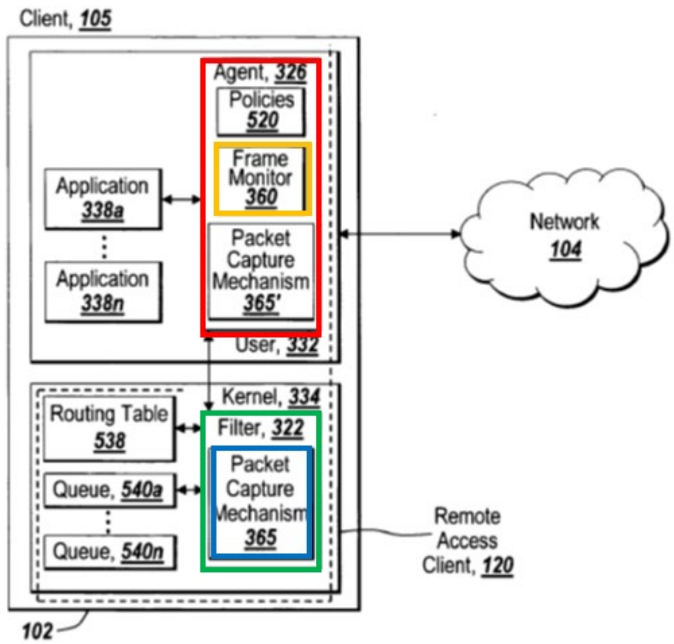
A. Rao

Rao discloses a computing device (e.g., a mobile device) with a processor (CPU, yellow), memory/storage (green), user interface (red arrows), and network interface (blue):



Rao, Fig. 1D, ¶¶118-28. Rao's device "connect[s] to network 104" through one or more "LAN or WAN links" and/or "wireless connections," and "execute[s] one or more applications … which access the network." Rao ¶125; EX-1003 ¶¶70-72.

Rao uses "client-side application-aware" policies to control network communications. Rao ¶179. Remote access client 120 operates to enforce these policies. Rao explains that it may include an agent (**red**), filter (including filtering table) (**green**), packet capture mechanism (**blue**), frame monitor (**gold**), and network driver.



Rao, Fig. 5A, ¶¶99-101, 114-16. These may have overlapping functionality or be combined in any fashion. *Id*. ¶¶114-16; EX-1003 ¶¶73-74.

The remote access client intercepts inbound and outbound network packets and prioritizes those packets based on Rao's policies. Rao ¶¶101-05; *see also id.* ¶¶ 57, 108-10; EX-1003 ¶75. Rao teaches that its policies may be defined in a "multitude of ways," including by application and based on whether an application associated with a packet is "running in the foreground or the background." Rao, ¶¶182, 188-93; EX-1003 ¶¶77-78. Rao broadly discloses that the enforcement may occur at different processing locations and levels. Rao ¶101; EX-1003 ¶76.

Rao invites a POSA to combine all of its teachings, which it sometimes describes as "embodiments." Rao ¶¶218-19; *id.* ¶¶74, 131. Based on Rao's

suggestion, a POSA would have understood Rao to disclose various aspects of a single system. EX-1003 ¶79. Even if Rao's "embodiments" were separate inventions, a POSA would have been motivated and found it obvious to combine those in view of Rao's express invitation and taught benefits. *Id.*; Rao ¶¶3, 218.

B. Montemurro

Montemurro also teaches a mobile device (such as a PDA or smartphone) in which policies act to allow or deny network activities. Montemurro ¶29. Montemurro's device includes Wi-Fi and cellular transceivers, "non-volatile memory," and a "microprocessor." *Id.* ¶¶50-59.

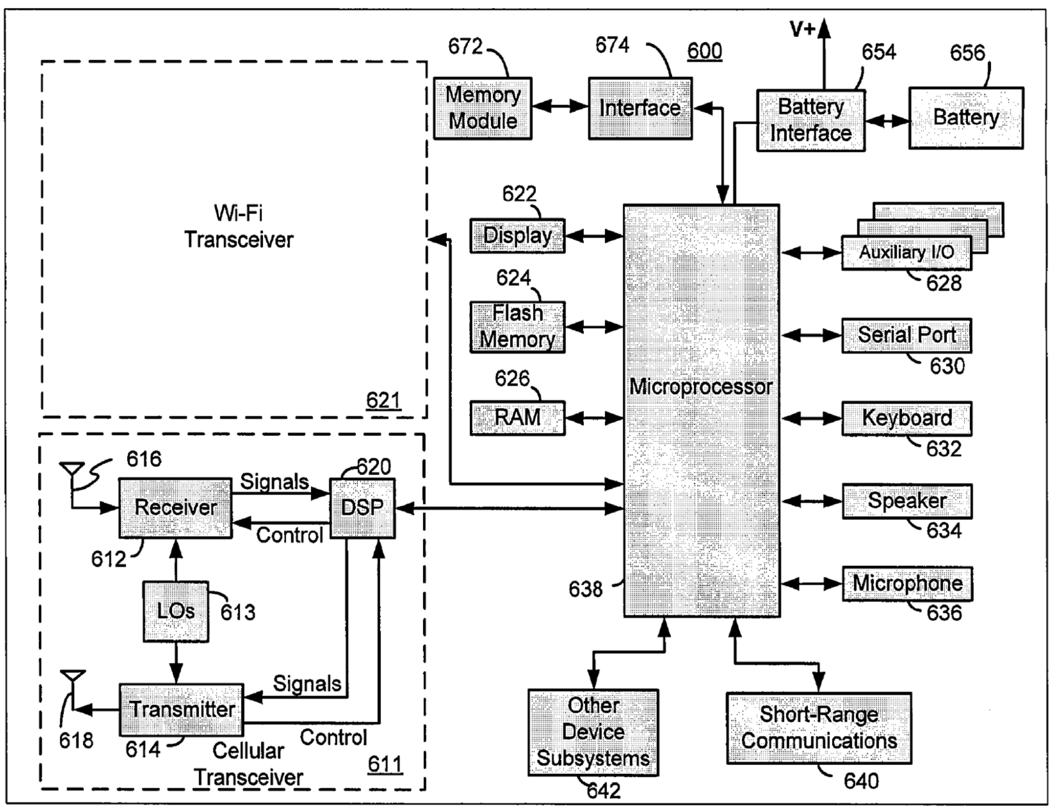


Figure 6

Id., Fig. 6; EX-1003 ¶¶81-82.

Montemurro explains that its mobile device (client) runs "**applications**" that communicate over the internet through two or more "**network interfaces**" including WLAN and WWAN.

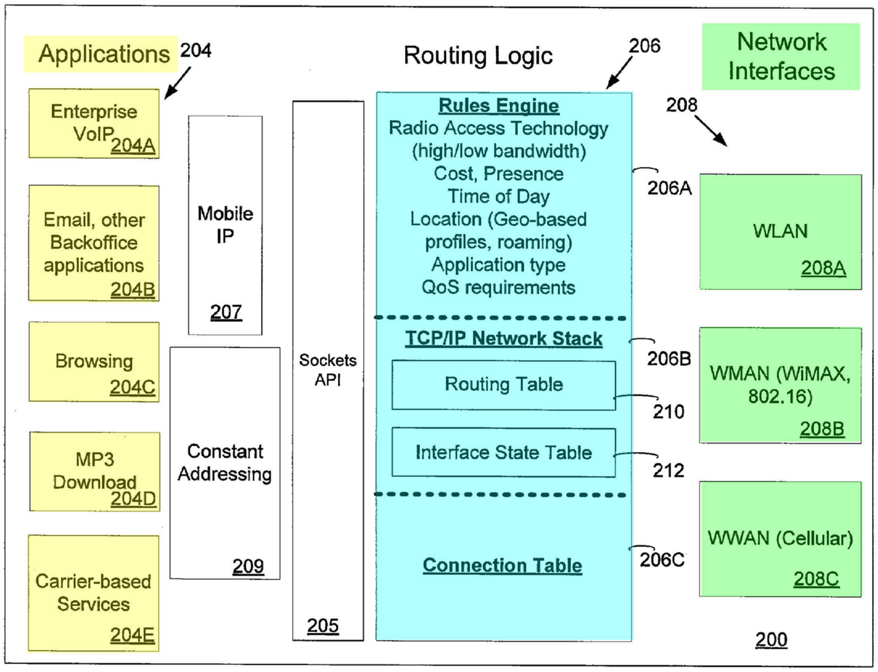


Figure 2

Montemurro, Fig. 2; EX-1003 ¶¶81, 83-84.

Montemurro controls the applications' internet access through a set of application-specific rules/policies applied by a "rules engine." Montemurro ¶¶11, 27, 29; EX-1003 ¶¶85-86. Montemurro discloses that its policies may be based on various criteria, including whether the device is connected to a "WLAN" and "WWAN" network. *See* Montemurro, Fig. 1; EX-1003 ¶¶86-88. Montemurro's policies control networks used by its applications by modifying a routing table based on interactions with "connection API's." Montemurro ¶¶34-35; EX-1003 ¶85.

C. Freund

Like Rao, Freund's "mobile computer" includes a processor, storage, memory, and network access cards:

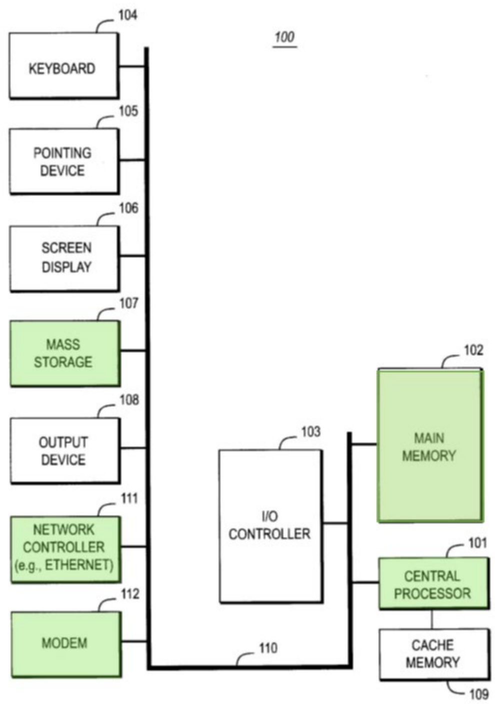
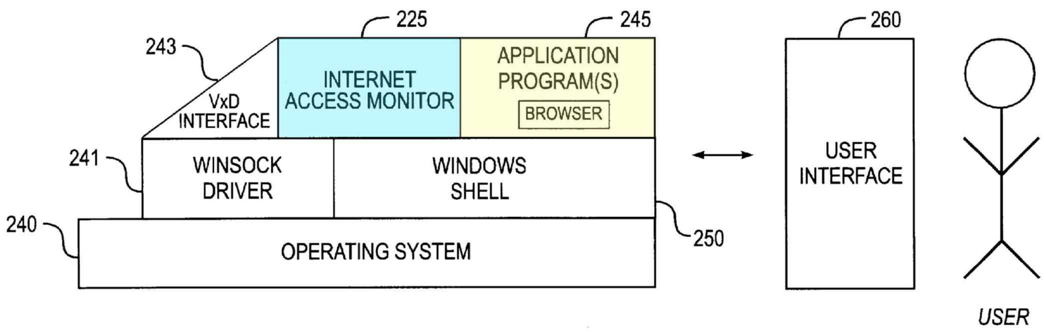


FIG. 1

Freund, Fig. 1, 7:32-61.

The mobile computer (client) includes "application programs," and Freund, filed in 1997, teaches a "client monitor" to enforce application-specific network traffic control policies. *Id.*, 7:64-8:39.



Id., Fig. 2.

Using a "user interface," users configure these application-specific policies to allow/block internet access based on criteria including an application's "foreground"/"background" status and time-of-day. Freund, Abstract, 5:12-15, 10:16-43, 15:12-21:46, Figs. 4, 5, 7A-7K, 12A-12C, 13A-13B; EX-1003 ¶¶90-93.

D. Araujo

Araujo (like Rao, Montemurro, and Freund) uses the long-known approach of implementing policies to control activities of "wireless telephones." Araujo ¶14. Araujo applies its policies to address the problem of power and battery management. *Id.* ¶¶1-4; EX-1003 ¶¶95-96.

Araujo teaches that its components, including modems (network cards) expend power, and it describes a power-policy to manage power consumption:

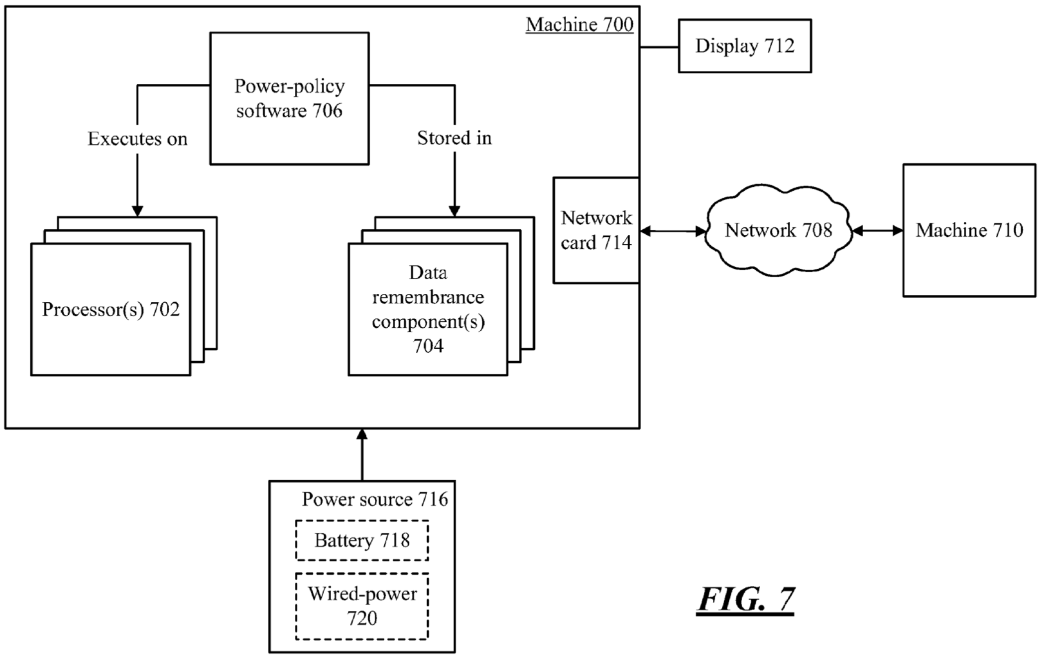


FIG. 7

Araujo, Fig. 7, ¶¶4, 20, 52-57 (managing a "wireless network card" and "request to send data over a wireless network"); EX-1003 ¶¶97-99.

Araujo's power policy decides whether to allow or deny an action (e.g., powering on a network card) based on factors including an application's status (e.g., "high" or "low" priority). Araujo, ¶¶4, 26, 32-33. For example, Araujo may "permanently or temporarily" deflect a request to send information over the network card if the application making the request is of insufficient status to warrant powering on the card. *Id.*, Figs. 3-4, 6, ¶51; EX-1003 ¶¶99-101.

VI. GROUND 1: RAO-MONTEMURRO-FREUND RENDERS OBVIOUS CLAIMS 1-14, 16, 18-23

A. Motivation to Combine

A POSA would have found it obvious to combine the complementary disclosures of Rao, Montemurro, and Freund. EX-1003 ¶¶105-22.

All three references teach controlling network communications to and from applications on a mobile device. *See, e.g.*, Rao, Fig. 1D, ¶¶118-28; Freund, Fig. 1, 7:32-61; Montemurro ¶¶29, 50-59. And a POSA would have looked to Montemurro and Freund to improve Rao given the references' similarities. EX-1003 ¶¶106-07.

Rao, for example, discloses that a mobile device may "switch[] between networks" and that the device may connect to "one or more networks," including a local area network (LAN), wide area network (WAN), and the internet. Rao ¶¶81, 92, 95, 125. It teaches that its device may have a "modem or any other device" suitable for interfacing with these networks. *Id.* ¶125. Rao further discloses that its remote access client can prioritize network packets communicated over its networks according to any policy considerations and invites a POSA to "recognize and appreciate" criteria that may be used. *Id.* ¶¶188-89. Rao expressly proposes prioritizing packets by one or more of "whether the application 338*a*-338*n* associated with the network packet is running in the foreground or the background" of the user device, "process task priority," type of associated application, protocol

used by the associated application, the size of the network packet, or time, among others. *Id.* ¶¶188-92.

Montemurro builds on these disclosures. Like Rao, Montemurro teaches "[w]ireless communication devices capable of communicating in at least two network communication modes (e.g., WLAN such as Wi-Fi . . . and WWAN such as GSM/GPRS cellular and wired modes." Montemurro ¶11. It describes that to facilitate these network connection modes, the device includes "an interface for each of WLAN 208A, WMAN 208B and WWAN 208C network communications." *Id.* ¶28. Montemurro further teaches classifying the network type the device is using through a routing table. *Id.* ¶30. Using that information, Montemurro suggests, the device can selectively allow or deny network communications based on the type of network to which the device is connected. *Id.* ¶4; EX-1003 ¶111. Montemurro teaches that by implementing network-specific network control policies, the user can save costs and improve communication quality. *Id.* ¶4; EX-1003 ¶112.

At least in view of these benefits, a POSA would have been motivated to include Montemurro's teachings related to network interfaces, network classification, and network-based policies in Rao. EX-1003 ¶113. Rao, like Montemurro, suggests multi-mode connections, Rao ¶¶81, 92, 95, 125, and invites POSAs to control network communications based on multiple criteria, *id.* ¶¶188-92; EX-1003 ¶114. And a POSA would have understood the cost- and quality- benefits

of combining Rao and Montemurro in this way. Montemurro notes these benefits, Montemurro, ¶4, and they were well-known in the art. *See, e.g.*, EX-1015 ¶¶4-5, 54, 68, claim 6; EX-1014 ¶¶48, 252, 279-285, Figs. 10A-10B; EX-1003 ¶115. A POSA would accordingly have been motivated to apply Montemurro's teachings to Rao, and would have reasonably expected to succeed in doing so given the references' teachings. EX-1003 ¶115.

A POSA would have been further motivated to implement the teachings of Freund in the Rao-Montemurro system. Like Montemurro, Freund expands on Rao's teachings. Rao teaches that its policies may "be configurable by a user by any suitable means and/or mechanism." Rao ¶183. Freund details how a user may configure policies, offering exemplary interfaces, discussing various policy augmentations, and explaining that policies may direct the system to deny a user internet access, warn users of issues, or redirect access. *See, e.g.*, Freund, 4:5-5:5, 8:45-53, 12:54-13:22, 23:65-27:50, Figs. 7A-7K. Similarly, Rao controls network traffic in part by distinguishing between foreground and background activity, *see, e.g.*, Rao ¶182, and Freund likewise monitors inbound and outbound network communications and distinguishes between network activity based on whether it is foreground or background activity, Freund, 14:51-21:50, 8:63-9:3, 10:16-43. Freund identifies foreground and background activity based on "whether the application receives 'focus' and/or receives user input (e.g., mouse clicks or key strokes)." *Id.*,

10:40-43. And it maintains a list of actively used processes to "determine if [a] process . . . should have access to the Internet and what kind of access . . . is permissible." *Id.*, 4:5-5:5.

As with Montemurro, given Freund's and Rao's similarities, a POSA would have been motivated to implement Freund's teachings in Rao. EX-1003 ¶119. And because Freund enhances different aspects of the Rao system than Montemurro, a POSA would have been likewise motivated to apply Freund's teachings to the Rao-Montemurro system. *Id.* ¶120. Freund describes its approach as "advantageous," and a POSA would have been motivated to incorporate Freund's teachings to improve the combined system's user friendliness (e.g., in view of Freund's detailed "rules wizard" for policy configuration and its policy options) and to implement the background/foreground prioritization suggested by Rao. Freund, 10:55-11:28; EX-1003 ¶120. A POSA would have recognized that the proposed combination would have had particular benefits in corporate settings where an employer may wish to monitor (and impose limits on) employees' device use, as Freund teaches. *See* Freund, 8:63-9:3, 10:16-43 ("[I]t is desirable to monitor the time an employee spends 'actively' interacting with the Internet," as opposed to background email and other process, to "control[] counterproductive Web browsing."); EX-1003 ¶121.

A POSA would have had a reasonable expectation of success in combining Rao, Montemurro, and Freund. The proposed combination combines known

hardware and software components (including, e.g., standard device components and policy modules) operating according to their known use for their known, commonly intended purpose (e.g., to monitor network communications and take actions according to set policies), to achieve known benefits (e.g., control of network communications). EX-1003 ¶122.

B. Claim 1

1. [1.0] A wireless end-user device, comprising:

Rao-Montemurro-Freund teaches a "wireless end-user device." Rao discloses a "mobile client, such as a notebook, personal digital assistant (PDA), a smart phone, or any type of mobile computing or telecommunication device." Rao ¶198. This client may connect wirelessly to a network. *Id.* ¶¶81, 100, 125, 217; EX-1003 ¶124.

Montemurro and Freund teach similar devices, *e.g.*, Montemurro ¶50 (describing "handheld wireless communication device"); Freund, 5:12-15 (describing internet access by "mobile computer on the road"), and a POSA would have been motivated to implement the combined system as a wireless end-user device, EX-1003 ¶125. These were well known at the time of the alleged invention, and a POSA would have had a reasonable expectation of success. *Id.*

1. [1.1] a wireless wide area network (WWAN) modem to communicate data for Internet service activities between the device and at least one WWAN, when configured for and connected to the WWAN;

[1.2] a wireless local area network (WLAN) modem to communicate data for Internet service activities between the device and at least one WLAN, when configured for and connected to the WLAN;

Rao-Montemurro-Freund teaches these limitations.

Rao discloses that its device communicates network packets over network 104. *E.g.*, Rao ¶¶99, 110, 179-80, 185 ("obtain inbound and/or outbound packets of the client 105, such as the network traffic associated with application 338"); *id.* ¶¶125, 195 (describing wireless interfaces/connections). Montemurro and Freund describe similar network communications. *E.g.*, Montemurro ¶31 (discussing IP packet transmission over network); Freund, 11:30-12:42 (same). A POSA would have understood these communications to be "data for Internet service activities" and would have understood the device must communicate such data for its internet connection. EX-1003 ¶129 (explaining internet access is facilitated by device-network packet exchanges).

Rao further teaches that its device may access networks, including WAN and LAN networks, by wired or wireless connection, and that its device may include a "network interface" to interface with a network, which may be a modem. Rao ¶¶95, 125. Montemurro similarly teaches that a device may connect to multiple networks,

including a WWAN and WLAN networks, using a network interface for each network type. Montemurro, Abstract, ¶¶3, 11-13, 50-54, Fig. 2. Montemurro teaches that such "multi-mode" devices, those "capable of communicating in at least two communication modes (e.g., WLAN such as Wi-Fi . . . and WWAN)," allow "optimize[d] communications," reduce costs (e.g., by avoiding networks with an associated costs), and improve communication quality. *Id.* ¶¶3-4, 11-13; EX-1003 ¶131.

Given these benefits, a POSA would have been motivated to include both a WLAN and a WWAN network interface in the Rao-Montemurro-Freund wireless network device to facilitate internet access over multiple network types. EX-1003 ¶132; *supra* §VI.A. A POSA would have implemented the network interfaces as modems in view of Rao's suggestion to do so and would have recognized such modems are to communicate data as claimed when configured for and connected to the respective WWAN or WLAN network. Rao ¶125; EX-1003 ¶132. Freund's disclosures are not contrary, and a POSA would have had a reasonable expectation of success in implementing this aspect of Rao-Montemurro-Freund. EX-1003 ¶¶133-34.

2. [1.3] a non-transient memory to store

Rao-Montemurro-Freund teaches this limitation. Each reference relies on non-transient memory to store policy-related information. *E.g.*, Rao ¶¶116

(describing stored "executable instructions"), 119 (explaining processor "responds to and processes instructions fetched from the main memory unit"), 124 (describing memory for storing application software and programs such as the remote access client software"); Montemurro ¶¶53-56 (disclosing memory for storing configuration data and applications); Freund, 7:46-8:10 (describing software stored in memory), Fig. 1.

A POSA would have understood the disclosed memory includes "non-transient memory," e.g., Rao's "hard disk drive[]" and Freund's "mass storage," and a POSA would have been motivated to store information needed in the long-term (e.g., information related to the traffic control policy) in non-transient memory in Rao-Montemurro-Freund. EX-1003 ¶137. Storing information in non-transient memory was well-known, *e.g.*, EX-1015 ¶¶36-37; EX-1019, Fig. 1A, and a POSA would have had a reasonable expectation of success, EX-1003 ¶138.

3. [1.3.1] a differential traffic control policy list distinguishing between a first one or more applications resident on the device and a second one or more applications and/or services resident on the device, and

[1.3.2] a differential traffic control policy applicable to at least some Internet service activities by or on behalf of the first one or more applications;

Rao-Montemurro-Freund teaches these limitations.

Rao discloses that its "remote access client 120" is stored on a hard disk drive (non-transient memory). Rao ¶124; EX-1003 ¶140. Remote access client 120 has

"one or more policies 520" that specify transmission priority for network packets associated with certain of the device's applications. Rao ¶182. Remote access client 120, which is stored in Rao's non-transient memory, *supra* [1.3], discloses both a "differential traffic control policy" and a "differential traffic control policy list."

First, Rao's prioritization policy is a "differential traffic control policy" as claimed in Limitation [1.3.2] because it applies differently to different packets—based on the assigned prioritization, a packet is placed in a different transmission queue and communicated more or less quickly (or is even discarded). *Id.* ¶¶191-94, 207; EX-1003 ¶141. The policy is a "traffic control" policy because it controls how network packets (which are network traffic) are sent and received by the device over the network. *Id.* ¶¶191-94, 207; EX-1003 ¶142.

Rao's policy is "applicable to at least some Internet service activities." EX-1003 ¶143. Rao explains that its policy is "for specifying client-side prioritization of network communications related to applications 338*a*-338*n*"—that is, the policy prioritizes (and thus applies to) internet service activities (the network communications) of Rao's applications. Rao ¶182; EX-1003 ¶143.

The policy is "applicable to at least some Internet service activities (network communications)" "by or on behalf of" a particular application or group of applications, which a POSA would have understood to be a "first one or more

applications." EX-1003 ¶¶144-45. Rao teaches that its policies may be specified for a particular application by "name," for a particular application "type," or based on other characteristics of the application, such as "whether an application is running in the foreground or the background." Rao ¶182; *id.* ¶¶188, 192. Rao gives an example of a policy prioritizing one group of applications (real-time data communications of an application) ahead of other applications' non-real-time data communications. *Id.* ¶184; *see also id.* ¶192.

Second, Rao teaches a differential traffic control policy list as claimed. EX-1003 ¶146. Rao includes applications "resident" on the device. *E.g.*, Rao ¶¶3, 87-88, 124. To prioritize packets associated with particular applications (e.g., a first one or more of these applications or a second one or more applications), Rao uses remote access client 120's filter 322. Rao ¶¶99, 114-17, 179, Figs. 1C, 5A.

Filter 322 receives the "indicated priorities" established under Rao's policy and applies them to packets associated with particular applications. *Id.* ¶190. A POSA would have understood that the "indicated priorities" are a differential traffic control list as recited in Limitation [1.3.1]. EX-1003 ¶147. The indicated priorities distinguish between (e.g., a first one or more and a second one or more applications) because, as explained, they dictate different application of the traffic control (prioritization) policy for packets associated with different applications or types of applications resident on the device. Rao ¶¶182, 184, 188, 192; *see also id.* ¶¶3, 87-

88, 124. They are therefore "differential." EX-1003 ¶148. And a POSA would have understood the "indicated priorities" to be a list. *Id.* ¶149. Rao elsewhere explains that filter 322 stores information used to route the packets (e.g., the priorities) in a "filtering table," which filter 322 uses to determine if a packet "satisfies a condition *listed in the filtering table*." Rao ¶¶102-06; EX-1003 ¶149.

A POSA would have been motivated to use a differential traffic control policy and list, as taught by Rao, in Rao-Montemurro-Freund. A POSA would have been aware of the benefits of implementing an application-specific traffic control policy, including improving communication quality and regulating bandwidth. *E.g.*, EX-1015, ¶¶4-5, 54, 68, claim 6; Montemurro ¶¶29, 56-59 (describing benefits of allowing "preferred" applications internet access); EX-1003 ¶150. Rao explains that its prioritization can be used for any of a "multitude" of defined priorities, and a POSA would have appreciated the flexibility of Rao's traffic control policy. Rao ¶182; *see also id.* ¶3 (explaining benefits of applying different prioritization to, e.g., prevent background activity from being processed ahead of foreground activity); EX-1003 ¶151.

Montemurro and Freund similarly teach application-specific policies and the use of lists to implement those policies, confirming the appeal of Rao's approach and a POSA's likelihood of success in implementing this aspect of Rao-Montemurro-Freund. *E.g.*, Montemurro ¶¶27, 29, 32-24 (describing rules and

"connection table"); Freund, 12:66-13:43 (describing "database of access rules" identifying "a list of applications or application versions that a user can or cannot use in order to access the internet"); EX-1003 ¶152. To the extent it is argued that Rao does not disclose the claimed policy or list, Montemurro and Freund do, and a POSA would have been motivated to implement these features in Rao-Montemurro-Freund for the reasons discussed above. EX-1003 ¶153.

4. [1.4] an interface to allow a user to augment the differential traffic control policy for the first one or more applications but not for the second one or more applications and/or services; and

Rao-Montemurro-Freund teaches this limitation. Rao explains that a user may "configur[e]" an aspect of a policy through "*a user interface, graphical or otherwise, design[ed] and constructed for configuring or specifying the policies 520*." Rao ¶183; EX-1003 ¶155. Montemurro and Freund similarly teach that a user may beneficially use a user interface to allow the user to configure rules (e.g., aspects of the larger policy). *E.g.*, Montemurro ¶36 (describing interface for "configur[ing] rules"); Freund, 8:10-12, 23:65-27:50 (describing interface for "modify[ing]" rule), Fig. 7A (button 712); EX-1003 ¶156.

A POSA would have understood that by configuring or modifying the policy, e.g., by adding a criterion, the user is "augmenting" the differential traffic control policy. EX-1003 ¶157. And a POSA would have been motivated to include this option in Rao-Montemurro-Freund, as the references all suggest, to give the user

increased control and flexibility. *Id.* This implementation would have required only routine skill as demonstrated by all the references' teachings (including Freund's 1997 suggestion). *Id.*

Freund further suggests that only certain aspects of the policy (e.g., aspects applicable to the first one or more applications but not for the second one or more applications) may be augmented. It explains that when a rule is created the user can "selectively include or exclude applications" (or groups of applications). *See, e.g.*, Freund, 24:17-27:36, Fig. 7A, 7D; EX-1003 ¶159. Subsequent modifications to the policy, e.g., to add a time constraint, augment the policy for the first one or more applications but not the second one or more applications (which are already excluded from the rule). EX-1003 ¶159; Freund, Fig. 7H-7K; 27:4-50.

Moreover, to the extent this limitation requires that the interface *prevent* augmentation of the second one or more applications, Freund teaches that its rules may be restricted so that end-users may not modify particular rules, which are aspects of the larger policy. *E.g.*, Freund, 27:18-35 (describing limitations on who may modify); EX-1003 ¶160. Freund explains that organizations may wish to impose rules that individual users cannot modify—for example, the policy may block internet access for specified internet browsers, and users may be unable to modify that rule. *Id.*, 26:31-27:36. But although users could not modify the policy as applied to those browsers (e.g., a second one or more applications), users could

potentially modify the access policy applicable to the remaining browser applications (e.g., the time windows when the browser has internet access). *Id.*; EX-1003 ¶¶160-61.

A POSA would have been motivated to include Freund's teachings related to modifications and permissions in Rao-Montemurro-Freund because Freund describes benefits to allowing a central authority (e.g., an employer) to regulate users' activities to protect against various security threats and "abuse . . . for unauthorized personal activities" without the user disabling/modifying important aspects of the policy. Freund, 9:22-11:27; *id.*, 2:2-14; EX-1003 ¶162 (discussing EX-1014 ¶¶78, 229). Montemurro similarly contemplates that an "administrator" may configure rules, Montemurro ¶36, confirming the benefits described in Freund, EX-1003 ¶163. And in view of Freund's detailed teachings, a POSA would have had a reasonable expectation of success. *Id.*

5. [1.5] one or more processors configured to

Rao-Montemurro-Freund discloses this limitation. Each reference relies on processors to execute policy-related software, and a POSA would have been motivated to rely on such a well-known processor for the functions described in Limitations [1.5.1], [1.5.2], and [1.6] in the combined system. *E.g.*, Rao ¶¶118-20, Figs. 1D, 1E; Montemurro ¶¶34, 55-59; Freund, 7:32-61, Fig. 1; EX-1003 ¶165.

6. [1.5.1] classify a wireless network to which the device currently connects in order to communicate data for Internet service activities as at least one of a plurality of network types that the device can connect with,

Rao-Montemurro-Freund teaches this limitation. Montemurro describes a "routing table" that "updates according to which interfaces 208 [e.g., modems] are available. Montemurro ¶30; EX-1003 ¶167. For instance, if both the WLAN and WWAN . . . are connected to their respective networks" the routing table reflects those connections:

Source IP	Destination IP	Device Interface (208)
192.168.1.20	0.0.0.0	WLAN (208A)
67.69.20.142	0.0.0.0	WWAN (208C)

Montemurro ¶¶30-31; *id.* ¶¶40-42, Figs. 2, 3. A POSA would have understood that when Montemurro's interfaces are "connected to their respective networks," the wireless network is one to which the device currently connects in order to communicate data (e.g., packets) for internet service activities. EX-1003 ¶¶168-69, 171. And by classifying the network based on the interface it uses (e.g., WLAN or WWAN), Montemurro classifies the network as "at least one of the plurality of types that the device can connect with." EX-1003 ¶¶170-71.

A POSA would have been motivated to incorporate these teachings into Rao-Montemurro-Freund. Montemurro teaches the benefits of a multimode operation that

applies a policy specific to a network type (e.g., permitting certain activities on some network types and not others). *E.g.*, Montemurro, Abstract, ¶¶4, 11, 14, 29; EX-1003 ¶172; *supra* §VI.A. A POSA would have understood that classifying the available wireless networks to which the device currently connects by type, as Montemurro suggests, is a predicate to implementing the multimode functionality Montemurro touts. *E.g.*, Montemurro ¶¶11, 30-35; EX-1003 ¶173. Implementing this classification in Rao-Montemurro-Freund would have required only ordinary skill. EX-1003 ¶173.

7. [1.5.2] classify whether a particular application capable of both interacting with the user in a user interface foreground of the device, and at least some Internet service activities when not interacting with the user in the device user interface foreground, is interacting with the user in the device user interface foreground, and

Rao-Montemurro-Freund teaches this limitation. Rao and Freund both explain that an application may operate in the foreground or the background of a user device. For example, Rao describes "foreground" applications currently in active use by the user" and those providing "interactive user session[s] … such as video, voice, chat." Rao, ¶¶3, 133, 140; *see also id.* ¶¶88, 91-92. These applications are thus capable of "interacting with the user in a user foreground of the device." EX-1003 ¶176. They are also capable of internet service activities (e.g., sending and receiving network packets) when not interacting in the device display with the user. EX-1003 ¶177.

When applying its policy, Rao considers whether these applications are currently "running in the foreground or the background," confirming its applications are capable of either operation. *E.g.*, *id.* ¶¶182, 188; EX-1003 ¶177. Freund similarly teaches that an application may be interacting in the user interface foreground of the device (e.g., an email application when the user is typing an email) or may be engaging in internet activity when not interacting with the user in the device foreground (e.g., the email application "intermittently poll[ing] an Internet-based mail server"). Freund, 10:16-43.

Both Rao and Freund teach that it is advantageous to classify whether a particular application (and its associated internet use) is interacting with the user in the device interface foreground. Rao teaches that its remote access client may "determine whether the application 338*a*-338*n* associated with [a] network packet is running in the foreground or the background of the client" and suggests applying the differential policy based on "whether an application is running in the foreground or the background of the client." Rao ¶¶182, 188. Freund similarly teaches examining each application to "determine[e] whether it is 'active' by determining whether the application receives 'focus' and/or receives user input (e.g., mouse clicks or key strokes)." Freund, 10:16-43. Freund discloses that making this determination facilitates rules limiting an employee's "counterproductive Web browsing." *Id.*

In view of Rao's and Freund's teachings, a POSA would have been motivated to classify whether a particular application was interacting in the device user interface foreground in Rao-Montemurro-Freund to facilitate the background/foreground-specific rules allowing or denying particular packets' transmission as the references suggest. *Supra* §VI.A; EX-1003 ¶180. Montemurro's disclosures are not contrary, and a POSA would have reasonably expected success in implementing this aspect of the combined system. EX-1003 ¶181.

8. [1.6] selectively allow or deny one or more Internet service activities by or on behalf of the particular application based on whether or not the particular application is one of the first one or more applications, the differential traffic control policy, including any applicable user augmentation of the differential traffic control policy, and the classifications performed by the one or more processors.

Rao-Montemurro-Freund teaches this limitation.

First, Rao-Montemurro-Freund teaches "selectively allow[ing] or deny[ing] one or more internet activities by or on behalf of [a] particular application." Each of the references suggests allowing/denying internet activities by particular applications.

Rao, for example, teaches that based on its policy, the system may "discard network packets" (internet service activities), particularly during a network disruption, while queueing other packets to be transmitted. Rao ¶207; *id.* ¶¶102-05 (describing decision to "drop" or "accept" packets). A POSA would have understood

that discarded packets are "denied" and packets queued and transmitted are "allowed." EX-1003 ¶185. Rao "selectively" denies and allows because the policies "determine which network packets to queue and/or discard. For example, a network packet of a first application 338*a* may be queued while a network packet of a second application 338*n* is discarded." Rao ¶207; EX-1003 ¶185; *see also* EX-1010, 1 (conceding Rao may discard packets after establishment of internet service). Rao further teaches deprioritizing some packets while immediately allowing others, *e.g.*, Rao ¶¶38-40, 43, 180-88, and a POSA would have understood this de-prioritization is at least a temporary denial because packets are prevented from accessing network resources while higher-priority packets are being transmitted, EX-1003 ¶186. Likewise, Rao selectively allows the transmission of those higher-priority packets while temporarily denying the lower-priority packets. *Id.*

Montemurro similarly teaches denying internet service activities if a particular network is not available. Montemurro ¶29 (explaining particular application may "only" perform certain actions "over a WLAN network"). And Freund teaches that when its rules are violated (e.g., through overuse of an application), its system "den[ies] internet access." *E.g.*, Freund, 13:13-22. It further teaches that denying access (blocking) may be advantageous "when network traffic is already congested." *Id.*, 27:9-14, Fig. 14.

In view of the references' teachings, a POSA would have been motivated to selectively deny and allow internet service activities. EX-1003 ¶189. As the references teach, including the option to selectively deny is beneficial at least when there is congestion (as disclosed by Rao and Freund) or when no option to complete the activity in compliance with the applicable policy currently exists (as suggested by Montemurro and Freund). *Id.* A POSA would have similarly recognized that selectively allowing internet service activities in conformance with the policy facilitates high-quality communications in Rao-Montemurro-Freund. *Supra* §VI.A; EX-1003 ¶190. This implementation would have required only routine skill. EX-1003 ¶190.

Second, Rao-Montemurro-Freund teaches that the decision to selectively allow or deny is based on whether the particular application is one of the first one or more applications. As explained, *supra* [1.4], the combined system applies an application-specific differential traffic control policy and allows augmentation of the differential traffic control policy for the first one or more applications. A POSA would have understood that the decision to selectively allow or deny internet service activity is based in part on any augmentations and is accordingly based in part on whether the particular application is one of the first one or more applications. EX-1003 ¶191.

Third, Rao-Montemurro-Freund teaches that the decision to selectively allow or deny is further based on the differential traffic control policy, including any applicable user augmentation of the differential traffic control policy. As explained, *supra* [1.3.2], [1.4], Rao-Montemurro-Freund describes a differential traffic control policy that acts to prioritize/allow/deny particular packets based on the policy, which a user may augment in some circumstances. EX-1003 ¶192.

And **fourth**, Rao-Montemurro-Freund teaches that the decision to selectively allow or deny is further based on the classifications of [1.5.1] and [1.5.2] (e.g., the network type and whether an application is interacting with the user in the device user interface foreground).

As explained, *supra* [1.5.1], Rao-Montemurro-Freund teaches multimode operation, in which particular internet service activities are allowed or denied based on what network the device is using. A POSA would have understood that allowing or denying an internet service activity based on the network type is selectively allowing or denying that activity based on the classification discussed *supra* [1.5.1]. EX-1003 ¶¶193-94.

Similarly, as explained, *supra* [1.5.2], Rao-Montemurro-Freund teaches selectively allowing or denying an internet service activity based on whether the associated application is operating in the background or the foreground, which a

POSA would have understood is selectively allowing or denying that activity based on the classification discussed *supra* [1.5.2], EX-1003 ¶195.

A POSA would have been motivated to base the selective allowance or denial of an internet service activity on both these considerations. All three references invite a POSA to apply a multi-faceted policy. *E.g.*, Rao ¶¶182-84, 187-94; Montemurro ¶29; Freund, 4:8-28, 13:2-22, 23:65-27:49; EX-1003 ¶196. A POSA would have been motivated to do so in order to offer improved performance, lower cost, and customizability. EX-1003 ¶196; §VI.A. And in view of the references' disclosures, a POSA would have reasonably expected success in implementing this aspect of Rao-Montemurro-Freund. EX-1003 ¶196.

A POSA would have understood that these criteria could be implemented as part of a logic triggering different policies based on, e.g., the network type to which the device is connected or could be implemented as a single multi-faceted policy. *Id.* ¶197. For example, the network type can be a criterion in a policy:

(1) If network_type=WWAN (and optionally more criteria), then [action];

(2) If network_type=WLAN (and optionally more criteria), then [action].

Id. Or policy rules can be grouped conditionally, such that, once a first classification is made, a different "policy" applies:

(1) If network_type=WLAN then

(1A) if (additional criteria) then [action]

(2) If network_type=WLAN then

(2A) if (additional criteria) then [action]

Id. ¶198. Either approach would have been straightforward and routine for a POSA to implement using only ordinary skill in the art and would have achieved the desired ability to selectively allow or deny based on multiple considerations. *Id.* ¶199; Rao ¶182 (noting "hierarchical" and "conditional" policies).

C. Claims 2-5

Claim 1 requires that the decision to allow or deny an internet service activity be based on (1) whether its associated application is one of the first one or more applications, (2) the differential traffic control policy (and any applicable augmentation), (3) the classification of the wireless network, and (4) the classification of whether the application is interacting with the user in the device user interface foreground. *Supra* [1.6].

Claims 2-5 merely recite permutations of these elements and are obvious for at the least the reasons discussed in connection with claim 1. EX-1003 ¶¶201-02. Selecting one particular example from the limited number of different known permutations does not impart patentability. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421, (2007); EX-1003 ¶201. Indeed, the '613 patent does not describe any particular advantage of using the four claimed criteria to make the decision to allow or deny, much less using any specific permutation of those criteria. EX-1003 ¶202.

1. **Claim 2: The wireless end-user device of claim 1, wherein based on the differential traffic control policy the one or more processors <u>selectively deny</u> one or more Internet service activities by or on behalf of the particular application when**

the particular application is <u>one of the first one or more</u> applications,

the classified wireless network is a <u>WWAN type</u>, and

the particular application is classified as <u>not interacting with the user in the device user interface foreground</u>.

Rao-Montemurro-Freund teaches this limitation. The proposed combination discloses selectively denying internet service activities as discussed, *supra* [1.6], and thus renders obvious the specific implementation of claim 2, EX-1003 ¶204.

In addition, a POSA would have been motivated to include claim 2's limitation in Rao-Montemurro-Freund. *Supra* [1.6], §VI.A; EX-1003 ¶205. Limiting certain applications' (e.g., those not interacting with the user in the device foreground) activities to non-WWAN networks (selectively denying their internet service activities on WWAN networks) would have saved costs without degrading user experience, as suggested by Montemurro and Rao. *See, e.g.*, Montemurro ¶4, EX-1015 ¶¶4-5, 54, 68, claim 6; EX-1014 ¶¶48, 252, 279-285, Figs. 10A-10B; Rao ¶3; EX-1003 ¶206. And a POSA would have recognized the advantages of allowing the user to augment the rule for applications important to the user's work or general experience (the "first one or more applications") as suggested by Freund, so that the user could modify the rule and override the selective denial if needed (e.g., adding a

time-based criterion to permit access over any connection for a period). Freund, 4:19-28, 8:40-53, 13:13-22, 23:65-27:50; EX-1003 ¶207.

Given the references' teachings, a POSA would have reasonably expected success. EX-1003 ¶208. Indeed, Montemurro gives an example of a rule that discloses claim 2. *Id.* It teaches that a "CRM application" may "only synchronize the sales contact database . . . over a WLAN network." Montemurro ¶29. This selectively allows or denies the synchronization with the database (an internet service activity) on behalf of the CRM application. *Id.*; EX-1003 ¶208.

A POSA would have understood that in the combined system, the CRM application may be a first one or more applications that is subject to user augmentation. EX-1003 ¶209. Freund instructs that users may modify rules relevant to their areas of responsibility at work, *see, e.g.*, Freund, 4:19-28, 8:40-53, 13:13-22, and a POSA would have recognized that access to a contact database is the type of rule the user should be permitted to modify so that the user can access the database if needed (overriding the rule), EX-1003 ¶209.

Montemurro's suggested rule selectively denies synchronization when the CRM application is not connected to a WLAN network (e.g., when the classified network is instead a WWAN type). Montemurro ¶29; EX-1003 ¶210. And based on Rao and Freund's teachings, a POSA would have understood that synchronization is a background process like "poll[ing] an Internet-based mail server" that occurs

passively, when the application is not interacting with the user in the device user interface foreground. *E.g.*, Rao ¶3; Freund, 10:16-27; EX-1003 ¶210.

2. Claim 3: The wireless end-user device of claim 2, wherein the one or more processors are further configured to <u>override the selective denial</u> of one or more Internet service activities by or on behalf of the particular application <u>when the user has augmented the differential traffic control policy</u> so as to indicate that Internet service activities are allowable when the classified wireless network is the WWAN type, and the particular application is classified as not interacting with the user in the device user interface foreground.

Rao-Montemurro-Freund teaches this limitation. As discussed, a POSA would have understood the benefits of allowing the user to augment (e.g., modify to add criteria) the selective denial for certain applications, e.g., by allowing the user to override a selective denial by adding a time-based criteria to permit access over any connection, including a WWAN, for a period. *Supra* claim 2. A POSA would have understood that Rao-Montemurro-Freund's processors would be configured to apply the augmentation. *Supra* [1.5], [1.6]; EX-1003 ¶213. Montemurro provides an example of such a rule, and a POSA would have implemented this limitation in Rao-Montemurro-Freund for the reasons discussed above. *Supra* claim 2; EX-1003 ¶213.

3. Claim 4: The wireless end-user device of claim 2, wherein based on the differential traffic control policy the one or more processors <u>selectively allow</u> one or more Internet service activities by or on behalf of the particular application when

the particular application is <u>one of the first one or more</u> applications,

the classified wireless network is the <u>WWAN type</u>, and

the particular application is classified as <u>interacting with the user</u> in the device user interface foreground.

Rao-Montemurro-Freund teaches this limitation. The proposed combination discloses selectively allowing internet service activities as discussed, *supra* [1.6], and thus renders obvious the specific implementation of claim 4, EX-1003 ¶215.

In addition, a POSA would have been motivated to include claim 4's limitation in Rao-Montemurro-Freund. *Supra* [1.6]; §VI.A; EX-1003 ¶216. Allowing internet service activities by applications in the set of "first one or more applications" (e.g., those for which the user may augment rules) that are actively interacting with the user in the foreground to occur even on WWAN networks would have benefitted users. EX-1003 ¶216. A POSA would have understood that, as disclosed by Freund, applications subject to augmentation may be those important to the user's work, and as taught by Rao and Freund, applications interacting with the user in the device user interface foreground are those with which the user is actively engaged. *E.g.*, Rao ¶¶3, 188-89; Freund, 4:19-28, 8:40-53, 13:13-22;

EX-1003 ¶217. A POSA would have implemented Rao-Montemurro-Freund to allow internet service activities associated with, e.g., applications important to the user with which the user is actively engaged to improve the quality of the user experience, and a POSA would have reasonably expected success in this implementation given the references' teachings. EX-1003 ¶218; *supra* [1.6], claim 2.

4. **Claim 5: The wireless end-user device of claim 1, wherein based on the differential traffic control policy the one or more processors <u>selectively allow</u> one or more Internet service activities by or on behalf of a second particular application and/or service when**

the second particular application and/or service is <u>one of the second one or more applications</u> and/or services and

the classified wireless network is the <u>WWAN type</u>.

Rao-Montemurro-Freund teaches this limitation. The proposed combination discloses selectively allowing internet service activities as discussed, *supra* [1.6], and thus renders obvious the specific implementation of claim 5, EX-1003 ¶220.

In addition, a POSA would have been motivated to include claim 5's limitation in Rao-Montemurro-Freund. *Supra* [1.6]; §VI.A; EX-1003 ¶221. Freund teaches that there are applications (e.g., second particular applications) whose internet access should be controlled only at the administrator level. Freund, 27:17-36, Fig. 7I. A POSA would have understood that one example would be applications

that detect security issues—allowing an individual user to disable such an application's network access through modification of the policy might jeopardize other users' or company security. EX-1003 ¶222. Accordingly, a POSA would have understood that Internet service activities by or on behalf of an application that detects security issues should be allowed under the differential traffic control policy irrespective of the network type, including, e.g., when the classified wireless network is the WWAN type. EX-1003 ¶223. Freund suggests as much, emphasizing the importance of network security. Freund, 1:24-30 (noting issue), 12:38-40 (disclosing application that "detect security or other problems"); EX-1003 ¶223. In view of these disclosures, a POSA would have been motivated to implement this limitation in Rao-Montemurro-Freund and would have reasonably expected success. EX-1003 ¶224.

D. Claim 6: The wireless end-user device of claim 1, wherein the one or more processors are configured to classify that the particular application is interacting with the user in the device user interface foreground when the user of the device is directly interacting with that application or perceiving any benefit from that application.

Rao-Montemurro-Freund teaches this limitation. The processors classify an application as interacting with the user in the device user interface foreground (or not). *Supra* [1.5.2]; *see also supra* [1.5], [1.6]. Freund further teaches making this classification by examining an application and "determin[ing] whether the application receives 'focus' and/or receives user input (e.g., mouse clicks or key

strokes)," e.g., whether the user is "directly interacting" with the application. Freund, 10:16-43; EX-1003 ¶227.

A POSA would have been motivated to implement Freund's method in Rao-Montemurro-Freund to facilitate the foreground/background specific policies taught by Rao-Montemurro-Freund. *Supra* [1.6], §VI.A; EX-1003 ¶228. Freund's teachings are consistent with Rao's, which similarly classifies as "foreground" applications those "currently in active use by the user," e.g., "interactive user session[s] … such as video, voice, chat." Rao ¶¶3, 133, 140, 189; EX-1003 ¶228. Montemurro's teachings are not contrary, and a POSA would have been able to achieve this implementation through routine skill. EX-1003 ¶¶228-29.

E. Claim 7: The wireless end-user device of claim 1, wherein the user interface is further to provide the user of the device with information regarding why the differential traffic control policy is applied to the particular application.

Rao-Montemurro-Freund teaches this limitation. It includes a "user interface" to allow a user to augment a policy. *Supra* [1.4].

Freund teaches that the user interface may provide the user with information regarding why the differential traffic control policy is applied to an application. It teaches a "warning" or "error dialog" with rule-specific text that appears in the user interface and explains to the user that "<<appname>> has accessed the Internet . . . in violation of the access policies. The connection . . . will be terminated. Please

contact your system administrator if you have any questions." Freund, 4:25-27, 12:65-13:23, 26:51-27:3, 29:18-23, 30:12-49, Figs. 7G, 13A, 13B.

A POSA would have been motivated to include these error messages, as Freund suggests, in Rao-Montemurro-Freund to make the user aware of why an internet service activity was denied and provide a point of contact for questions. EX-1003 ¶¶233-34. In view of Freund's 1997 suggestion, a POSA at the time of the alleged invention would have reasonably expected success. EX-1003 ¶234.

F. Claim 8: The wireless end-user device of claim 1, wherein the differential traffic control policy is part of a multimode profile having different policies for different ones of the network types.

Rao-Montemurro-Freund teaches this limitation. The system includes modems for different network types and may apply different policies depending on the type of network the device is using. *Supra* [1.1], [1.2], [1.5.1], [1.6].

A POSA would have understood the traffic control policy of Rao-Montemurro-Freund may therefore be part of a multimode profile having different policies for different ones of the network types. EX-1003 ¶237. Montemurro describes its device as "multi-mode capable," Montemurro, ¶4, and teaches the benefits of varying policy based on the network type, *e.g.*, *id.* ¶¶27-29; EX-1003 ¶238. It discloses policy profiles for particular network types (e.g., a "WLAN network profile"), *id.* ¶27, and a POSA would have understood that the policies applicable to each network type can be considered a "multimode profile," EX-1003

¶239. A POSA would have included these features in Rao-Montemurro-Freund for the reasons discussed above. *Supra* §VI.A; EX-1003 ¶240.

G. Claim 9: The wireless end-user device of claim 8, wherein the one or more processors are further configured to select a traffic control policy from the multimode profile based at least in part on the classified wireless network type.

Rao-Montemurro-Freund teaches this limitation. As discussed, *supra* [1.6], claim 8, Rao-Montemurro-Freund may include different traffic control policies for different network types as part of a multimode profile, EX-1003 ¶242 (explaining claimed criterion may be implemented as part of a logic triggering different policies).

A POSA would have understood that in this configuration, the system processor would select the applicable traffic control policy based at least in part on the classified wireless network type. EX-1003 ¶¶243-44; *see also supra* [1.5], [1.6]. This is consistent with the references' disclosures of processors used to classify and execute policy-related software/rules, *supra* [1.5], [1.6], and a POSA would have had a reasonable expectation of success. EX-1003 ¶245. A POSA would have been motivated to implement Rao-Montemurro-Freund in this way for the reasons discussed in connection with limitation [1.6] and claim 8. *Id.*

H. Claim 10: The wireless end-user device of claim 9, wherein the one or more processors are further configured to, when the classified wireless network type is at least one type of WLAN, select the traffic control policy from the multimode profile based at least in

part on a type of network connection from the WLAN to the Internet.

Rao-Montemurro-Freund teaches this limitation.

Montemurro teaches that there are cost differences between different network connection types. *E.g.*, Montemurro ¶¶3-4. For example, it was known that WLANs could either be free (e.g., a corporate WLAN) or have a cost (e.g., a commercial WLAN hotspot). EX-1003 ¶247. A POSA would have understood that free/paid WLANs are "types" of WLANs and "type[s] of network connection[s] from the WLAN to the Internet." *Id.*

A POSA would have been motivated to configure the processors to select a specific traffic control policy based at least in part on whether the WLAN was free or paid at least because Montemurro suggests doing so. EX-1003 ¶248. It discloses varying policy based on network cost, e.g., by having an "MP3 download application . . . runs on the lowest cost network 104 and 106 available." Montemurro ¶29; *see also supra* [1.5], [1.6]. In view of Montemurro's suggestion, a POSA would have been motivated to implement these teachings in Rao-Montemurro-Freund to control user costs and would have had a reasonable expectation of success. EX-1003 ¶249.

I. Claim 11: The wireless end-user device of claim 1, wherein the plurality of network types include three or more of 2G, 3G, 4G, home, roaming, and WiFi.

Rao-Montemurro-Freund teaches this limitation. It implements the ability to connect to multiple network types, including, e.g., WLAN and WWAN networks. *Supra* [1.1], [1.2].

Montemurro discloses that using the WLAN interface a device may connect to WiFi. Montemurro ¶11. It further teaches that the WWAN interface includes "GSM/GPRS cellular" as well as "EDGE, UMTS, HSPA, CDMA, WCDMA, etc." *Id.* ¶¶3-4, 11. A POSA would have understood that e.g., GSM, is a "2G" standard. EX-1003 ¶251. And a POSA would have understood that, e.g., EDGE, UMTS, and WCDMA are "3G" standards. *Id.*

Based on Montemurro's disclosures, a POSA would have understood that Rao-Montemurro-Freund may connect to a plurality of network types, including at least 2G, 3G, and WiFi, and a POSA would have been motivated to implement Rao-Montemurro-Freund to permit those connections to increase the available network options, which would offer further avenues to decrease costs and improve quality. *E.g.*, Montemurro ¶¶3-4; *supra* §VIII.C; EX-1003 ¶252. The addition is consistent with Rao and Freund, which contemplate the use of different internet connection types, *e.g.*, Rao ¶95; Freund, 1:24-30, and given Montemurro's express suggestion, a POSA would have expected success, EX-1003 ¶252.

J. Claim 12: The wireless end-user device of claim 1, the one or more processors further configured to receive an update to at least a portion of the differential traffic control policy list from a network element.

Rao-Montemurro-Freund teaches this limitation. It relies on a differential traffic control policy and associated list. *Supra* [1.3.1], [1.3.2]. In view of the references' teachings, it would have been obvious to implement Rao-Montemurro-Freund such that its processor, *supra* [1.5], is configured to receive an update to at least a portion of the list from a network element. EX-1003 ¶254.

The combined system relies on a processor to retrieve and execute instructions. *Supra* [1.5], [1.6]; *see also, e.g.*, Rao ¶119, Montemurro ¶¶56-57. A POSA would accordingly have been motivated to, and expected success, in using the processor to receive updates to the list. EX-1003 ¶255.

Rao-Montemurro-Freund also teaches that its policies, and accordingly, the policy list, may be updated. For example, Freund teaches a local "rules database" (policy list) used to "intelligently determine" the action to take with respect to a particular internet service activity. Freund, 21:26-40; *see also id.*, 13:66-14:12, 16:8-29. Freund teaches modifications to its rules, *supra* [1.4], and it considers whether the system rules have "changed since last download," Freund, 21:26-40. In view of these teachings, a POSA implementing Rao-Montemurro-Freund would have understood that to effectively manage internet access, the differential control policy and list would need to be kept up to date. EX-1003 ¶257. A POSA therefore would

have been motivated to apply Freund's teachings to configure the system to receive periodic (or on-demand) updates to the differential traffic control policy list (or at least a portion thereof, for example, related to high-priority changes). *Id.* ¶258. This is consistent with, e.g., Montemurro, which explains that rules may be transferred to the device "upon an update," Montemurro ¶36, and Rao's disclosures are not contrary, EX-1003 ¶258. A POSA would accordingly have had a reasonable expectation of success as evidenced by the references' disclosures. *Id.*

Rao-Montemurro-Freund also renders obvious providing the update via a network element. All three references instruct that policy information may be provided by a network element. Rao describes that "policies 520 may be provided by or downloaded via the gateway 340," a network element. Rao ¶¶97, 183; EX-1003 ¶259. Montemurro similarly teaches that rules (policy) may be "configured off-device" and "transferred to the device via a communications interface" including "upon an update or other event." Montemurro ¶36. A POSA would have understood this type of off-device update to be from a network element. EX-1003 ¶259. And Freund teaches downloading policy rules from the supervisor module (a network element). Freund, 21:21-40. A POSA accordingly would have been motivated to provide updates to the differential control policy list via a network element. EX-1003 ¶160. A POSA would have understood that doing so would have been efficient, for example, in updating policies applicable to multiple devices, as suggested by

Freund. *Id.* The references' endorsement of providing policy information via the network element confirms that a POSA would have needed only ordinary skill for this implementation. *Id.*

K. Claim 13: The wireless end-user device of claim 1, wherein the plurality of network types include a roaming WWAN type and a home WWAN type, and the one or more processors are to apply the differential traffic control policy to one of but not both of the roaming WWAN type and the home WWAN type.

Rao-Montemurro-Freund teaches this limitation. For example, Montemurro teaches that a device may choose among "multiple available cellular networks from different cellular service providers." Montemurro ¶62. Montemurro uses cellular and "WWAN" synonymously, *e.g.*, *id.*, Fig. 2; EX-1003 ¶262. A POSA at the time of the alleged invention would have understood that when using cellular networks, the user may use their "home" network (e.g., the network provided by the user's cellular carrier) or a "roaming" network (e.g., a network not provided by the carrier). EX-1003 ¶263. At the time of the alleged invention, cellular carriers regularly imposed additional charges for "roaming," and Montemurro teaches that different rules (e.g., differential traffic control policy) may apply based on whether the network is "roaming." *Id.*; Montemurro ¶29; EX-1015 ¶¶4-5, 54, 68, claim 6; EX-1014, Fig. 4B, [0175]; EX-1003 ¶263. Montemurro therefore suggests applying differential traffic control policy to roaming WWAN and not home WWAN, which

would have resulted in cost savings by minimizing roaming charges. Montemurro ¶4; EX-1003 ¶264.

A POSA would have been motivated to apply Montemurro's teachings in Rao-Montemurro-Freund to achieve these savings. EX-1003 ¶265. A POSA would have recognized that, consistent with the references' teachings, the processor would apply the differential traffic control policy, *supra* [1.5], [1.6], and a POSA would have had a reasonable expectation of success in view of Montemurro's suggestions, EX-1003 ¶265.

L. Claim 14: The wireless end-user device of claim 1, wherein the plurality of network types include the WWAN type and a WLAN type, and the one or more processors are to apply the differential traffic control policy to one of but not both of the WWAN type and the WLAN type.

Rao-Montemurro-Freund teaches this limitation. Rao-Montemurro-Freund teaches connections to a plurality of network types, including WWAN and WLAN. *Supra* [1.1], [1.2]. It likewise includes a processor, which would apply the differential traffic control policy, *supra* [1.5], [1.6]; EX-1003 ¶267.

Rao-Montemurro-Freund further teaches applying the differential control policy to WWAN type networks and not WLAN type networks. As explained, Montemurro gives an express example of selectively denying internet service activities (through application of the differential traffic control policy) of an application on a WWAN network. *Supra* [1.6], claim 2; *see* Montemurro ¶29. And

as explained, a POSA would have been motivated to implement these teachings in Rao-Montemurro-Freund to avoid costs associated with WWAN networks. *Supra* [1.6], claim 2; *see* Montemurro ¶4. A POSA would have understood that Montemurro's teachings could readily be implemented by applying the differential traffic control policy to WWAN type and not WLAN type networks. EX-1003 ¶269. This implementation is consistent with Rao, which contemplates filtering (e.g., applying differential control policy) some networks but not others. *See, e.g.*, Rao ¶104; EX-1003 ¶269.

M. Claim 16: The wireless end-user device of claim 1, wherein the one or more processors are further configured to dynamically change the application of the differential traffic control policy based on a device usage state.

Rao-Montemurro-Freund teaches this limitation. Its processor, *supra* [1.5], [1.6], applies the differential traffic control policy, EX-1003 ¶271. And Rao-Montemurro-Freund teaches dynamically changing application of the differential control policy based on a device usage state.

As discussed, *supra* [1.3.2], [1.6], the Rao-Montemurro-Freund traffic control policy may be based on a "multitude" of defined priorities. As an example, Rao-Montemurro-Freund discloses that the policy may be based on a network type accessed. *Supra* [1.6]; EX-1003 ¶273. A POSA would have understood the type of network accessed is a device usage state and would have been motivated to base the policy on the network type accessed as explained above. EX-1003 ¶¶273-74.

In addition, Rao discloses that the policy may be based on whether the application is running in the foreground as well as other characteristics of the application, including "total execution time." Rao ¶¶188-89; EX-1003 ¶275. A POSA would have understood that these criteria reflect the "device usage state." EX-1003 ¶276. For example, as Rao explains, an application in the interface foreground is in active use—the user is interacting with the application, and the device is in active use. Rao ¶3; *see also* Freund, 3:12-16. And the application's execution time similarly reflects whether the application (and accordingly the device) is in active use. EX-1003 ¶276.

A POSA would have understood that the device's usage state would change, and the Rao-Montemurro-Freund traffic control policy would obviously change with it. EX-1003 ¶277. For example, where the policy prioritized "real-time" data communications in the device foreground (a policy criteria based on the device usage state), application of the policy would change dynamically as a user held a VOIP conversation (where the packets associated with the application would receive high priority) and then completed the call and left her device idle and ceased to give the VOIP app focus (when the same application's packets might receive lowest priority behind other background activities). *Id.*

A POSA would have been motivated to implement the Rao-Montemurro-Freund policy in this way to flexibly respond to "change[s] to real-time conditions"

as suggested by the references. Montemurro ¶2; EX-1003 ¶277. A POSA would have been able to implement this feature of Rao-Montemurro-Freund through routine skill. EX-1003 ¶277.

N. Claim 18: The wireless end-user device of claim 1, wherein the differential traffic control policy defines that the first one or more applications can only access a first one of the network types during particular time windows.

Rao-Montemurro-Freund teaches this limitation. As explained, *supra* claim 2, it teaches generally denying access to a WWAN type network by the first one or more applications but permitting the user to override the selective denial, e.g., by augmenting the applicable denial rule to allow internet access during a particular time window, EX-1003 ¶279. As explained, POSA would have understood that permitting the user to augment the policy to permit access during particular time windows would have been beneficial, and a POSA would have had a reasonable expectation of success. *Supra* claims 2, 23; EX-1003 ¶280 (citing EX-1015 ¶68; Montemurro ¶¶11, 29, 35, 39-42).

O. Claim 19: The wireless end-user device of claim 1, wherein the one or more processors are configured to classify that the particular application is interacting with the user in the device user interface foreground based on a state of user interface priority for the application.

Rao-Montemurro-Freund teaches this limitation. Its processor classifies whether a particular application is interacting with the user in the device user interface foreground. *Supra* [1.5], [1.5.2], [1.6]. Freund bases this classification on

"whether the application receives 'focus' and/or receives user input (e.g., mouse clicks or key strokes)." Freund, 10:16-43. A POSA would have understood that the application receiving focus or user input (and thus interacting with the user in the device user interface foreground) is the application in the highest interface priority. EX-1003 ¶283.

Based on Freund's teachings, a POSA would have been motivated to classify the application as interacting with the user in the device user interface based on a state of user interface priority for the application. *Id.* ¶284. A POSA would have recognized this approach as one of a finite number of approaches available to classify whether an application is interacting with the user in the device interface foreground as suggested by Rao and Freund, *id.*, and a POSA would have been motivated and reasonably expected success as discussed, *supra* [1.5.2].

P. Claim 20: The wireless end-user device of claim 1, wherein the second one or more applications are not subject to a differential network access control that is applicable to the first one or more applications.

Rao-Montemurro-Freund teaches this limitation. As discussed, *supra* [1.3.2], it teaches "application-specific" network traffic control policies. Under an application-specific policy, the first one or more applications may be subject to different controls than the second one or more applications, such that controls applicable to the first may not be applicable to the second. EX-1003 ¶287. For example, Freund teaches that particular applications may be permitted to access the

internet while others are blocked. Freund, 24:1-15. For example, applications approved by a system administrator might be exempt from certain policy controls. *Id.*; EX-1003 ¶288. A POSA would have been motivated to implement application-specific control policies and reasonably expected success. *Supra* [1.3.2]; EX-1003 ¶289.

Q. Claim 21: The wireless end-user device of claim 1, wherein the one or more processors are further configured to classify between: user applications; system applications, utilities, functions, or processes; and operating system application, utilities, functions, or processes.

Rao-Montemurro-Freund teaches this limitation. The references describe operating systems; system applications, including predetermined applications for basic functionality and windows shells; and user applications, including email clients and other user-facing programs (as well as operating systems). *E.g.*, Rao ¶¶99 (describing operating system with "user mode 332, also referred to as an application or user space and kernel-mode 334, which may be also referred to as the kernel or system level space"), 179 (describing applications "provid[ing] email, collaboration, online meeting, and/or desktop sharing related services or functionality"); Montemurro ¶¶56-57 (describing operating system, "predetermined set of applications that control basic device operations," e.g., system applications, and user applications); Freund, Fig. 2, 7:54-8:38 (describing system including user "client application software," a "windows shell," and an operating system); EX-1003 ¶¶291-92.

A POSA would have been motivated to implement Rao-Montemurro-Freund such that the processor classifies between the user, system, and operating system applications in order to ensure each class received the appropriate access to resources (e.g., memory) and to apply a hierarchy of applications (e.g., the operating system controlling other software). EX-1003 ¶¶293-95; *see also supra* [1.5], [1.6]. A POSA would have expected success in making this classification, which would have required only routine skill. EX-1003 ¶295.

To the extent the claim requires the "selectively allow or deny" be based on this classification, *supra* [1.6], Rao-Montemurro-Freund renders obvious this limitation. *Id.* ¶296. For example, Rao teaches both user-mode and kernel-mode (e.g., in connection with user-level and system-level applications). Rao ¶99. Rao further teaches an operating system, *id.*, and describes its importance, explaining that the operating system "control[s] scheduling of tasks and access to system resources," *id.* ¶128.

Montemurro similarly explains that its device relies on an operating system, *e.g.*, Montemurro ¶55, and includes both user applications and a "predetermined set of applications that control basic device operations, including at least data and voice communications applications," which a POSA would understand to be system applications, *id.* ¶¶56-57; EX-1003 ¶298. Freund, too, illustrates an operating system

on which both user applications (e.g., email clients) and system applications (e.g., a "windows shell") execute. *See, e.g.*, Freund, 7:62-8:10, Fig. 2; EX-1003 ¶298.

A POSA would have understood the differing importance of operating systems and system and user applications to the operation of the user device and been motivated to prioritize demand for internet access based on that importance. EX-1003 ¶299. For example, a POSA would have generally viewed an operating system update to be of greater importance than a network communication by a system application (e.g., a windows shell, a compiler or a file management software) or a user application (e.g., a game). *Id.* A POSA would have accordingly been motivated to make the classification and base the decision to selectively allow or deny the internet service activity at least in part on the classification of the associated application as, e.g., a system or user application or as an operating system application. *Id.* ¶300. A POSA would have done so in order to allow the policy to account for the relative importance of the activity to the operation of the device as a whole (rather than only a particular user application), and a POSA would have recognized a reasonable expectation of success in implementing Rao-Montemurro-Freund in this way based on the multi-faceted policies suggested by the references. *Id.*; *supra* [1.6].

R. Claim 22: The wireless end-user device of claim 1, wherein the second one or more applications or services comprises foreground services.

Rao-Montemurro-Freund teaches this limitation. Its applications, including "second one or more applications," may run in the device foreground (and may thus comprise foreground services). *Supra* [1.3], [1.5.2]. A POSA would understand that at least some of the second one or more applications (for which the user may not augment a policy) may be foreground services. EX-1003 ¶303. Freund gives one such example, explaining that an end-user can be prevented from modifying a policy restricting "counterproductive" personal web browsing. Freund, 10:16-43. Personal web browsing is a foreground service (the user is interacting with the browser), but Freund suggests a non-modifiable associated policy. *Id.*; EX-1003 ¶304.

A POSA would have been motivated to implement this suggestion in Rao-Montemurro-Freund to improve productivity as Freund suggests and would have reasonably expected success in this implementation given Freund's recommendation a decade earlier. EX-1003 ¶305.

S. Claim 23: The wireless end-user device of claim 1, wherein selectively deny comprises intermittently block when the one or more Internet service activities are requested during selected time windows.

Rao-Montemurro-Freund teaches this limitation. Both Freund and Montemurro teach allowing internet service activities only during particular time windows (and thus, intermittently blocking the activities during selected time

windows by denying internet access in "selected" windows other than the time windows in which access is permitted). Montemurro ¶¶11, 29, 35, 39-42 (describing internet access rules based on time of day); Freund, 4:5-28, 13:2-22, 27:4-16, Figs. 7A, 7H, 7K (same); EX-1003 ¶¶307-08.

A POSA would have been motivated to implement Rao-Montemurro-Freund to intermittently block internet service activities during selected time windows, because a POSA would have understood that time-based access saves costs because it takes advantage "of periods during which certain services are offered at reduced costs by wireless carriers." EX-1015 ¶68; EX-1003 ¶309. And a POSA would have understood that implementing the system with this feature would have required only ordinary skill, as evidenced by Montemurro's and Freund's suggestions. EX-1003 ¶310.

VII. GROUND 2: RAO-MONTEMURRO-FREUND-ARAUJO RENDERS OBVIOUS CLAIMS 15, 17 AND 24

A. The Motivation to Combine

Araujo teaches "Power Management Based on Policy." Araujo, Title. Mobile end-user devices have limited power resources (e.g., battery life), and Araujo discloses a policy that "may take into account a variety of factors" to manage power usage. *Id.* ¶¶1, 3. Its power policy may consider the device's "current power consumption" and "the amount of energy stored in a battery." *Id.* ¶¶4, 30-31.

Araujo's policy may also account for the power state of particular device components (e.g., on, off, monitor "brightness levels," processor "clock speeds"). *Id.*, ¶¶4, 14, 25. Araujo explains that device components, including the network cards (modems) that permit internet access, consume power. *Id.*, Abstract, ¶¶1, 2, 22, 56; EX-1003 ¶312 (explaining a network card that "may be used to facilitate machine 700's communication through network 708" encompasses a modem). And it teaches that, as one power policy factor, it is advantageous to identify program/application requests (e.g., sending a network packet) that may require changing the power state of a component (e.g., a modem) and to consider the priority of the program/application in deciding whether to permit the action. Araujo ¶¶2, 4; *see also id.* ¶20 ("Program 112 may be application software, system software, or any other type of software or hardware. . . . device 104 may be a machine 102's wireless network card, and request 113 may be a request to send data over a wireless network."). Araujo explains that by considering the component power state and the program/application priority, its power policy avoids wasting power from cycling components on and off. *Id.* ¶¶15-16, 28; EX-1003 ¶313.

A POSA would have been motivated to incorporate Araujo's power policy in Rao-Montemurro-Freund. Araujo teaches a solution to the well-known problem of limited battery life in wireless end-user devices like that of Rao-Montemurro-Freund. EX-1003 ¶314. Its policy relies on components (e.g., processors running

software stored in memory) present in Rao-Montemurro-Freund. Araujo ¶¶42, 52-56; *supra* [1.0]-[1.3], [1.4]-[1.5]; EX-1003 ¶314. Like Rao-Montemurro-Freund, Araujo uses a policy to decide whether to selectively allow or deny activity by or on behalf of an application (including internet service activity). *Supra* [1.6]; Araujo ¶¶37-44 (explaining that a request may be allowed, blocked, or delayed until a later time); *see also id.* ¶33 (explaining that under Araujo's policy, "[i]f an application with a low status is requesting use [of] a network card that is presently turned off . . . the low-status application's request may be denied or delayed"), Figs. 3-4; EX-1003 ¶314. And like Rao-Montemurro-Freund, *supra* [1.3.2], Araujo teaches that "any type of information" may be considered as part of its "rich" multi-factor policy, Araujo ¶¶3, 34; EX-1003 ¶314. A POSA would accordingly have had a reasonable expectation of success in implementing Araujo's teachings in Rao-Montemurro-Freund and would have been motivated to do so in order to better manage power use and preserve the battery life of the wireless end-user device. EX-1003 ¶314.

B. Claim 15: The wireless end-user device of claim 1, wherein the one or more processors are further configured to dynamically change the application of the differential traffic control policy based on a power state of the device.

Rao-Montemurro-Freund-Araujo teaches this limitation. Araujo teaches that its power policy may be based on "the amount of energy stored in a battery" of the device. Araujo ¶4, Fig. 2. It explains that its policy applies to the end-user device's "wireless network card . . . [and] a request to send data over a wireless network." *Id.*

¶20. It teaches that "the decision as to whether to power a device [e.g., the wireless network card, e.g., modem] may be different depending on whether a battery has already discharged 25% (or 75% or n%) of its energy." *Id.* ¶30; *see also id.* ¶2.

A POSA would have understood the amount of energy stored in the battery to reflect the power state of the wireless end-user device. EX-1003 ¶316. And because Araujo discloses that the decision as to whether to allow, e.g., a modem, to be turned on "may be different" depending on the battery state, a POSA would have understood Araujo to teach *dynamically* changing the application of the differential traffic control policy based on a power state of the device. *Id.* Araujo's power policy dynamically changes application of the differential *traffic control* policy because it impacts whether an internet service activity can proceed—if the modem is not allowed to be turned on in response to the application's request to send data over the wireless network (an internet service activity), the activity is denied, and the data packet cannot be sent. *Id.*

A POSA would have been motivated to implement Araujo's power policy as part of the "selectively allow or deny" decision made by the system's processor, *supra* [1.5], [1.6], and a POSA would have expected success for the reasons discussed above, *supra* §VII.A; EX-1003 ¶317.

Further, as will be discussed, *infra* claim 17, Araujo teaches that its power policy is based on the "[c]urrent power state of [the] device," e.g., the modem or

other component. Araujo ¶28, Fig. 2. A POSA would have understood that the power state of such components reflects the power state of the overall device, because components draw power from the same battery, *e.g.*, Araujo ¶¶30-32, Fig. 7, and a POSA would therefore have understood Rao-Montemurro-Freund-Araujo to teach this limitation for the additional reasons discussed below in connection with claim 17, EX-1003 ¶318.

C. Claim 17: The wireless end-user device of claim 1, wherein the one or more processors are further configured to dynamically change the application of the differential traffic control policy based on power control state changes for one or more of the modems.

Rao-Montemurro-Freund-Araujo teaches this limitation. Araujo's power policy "determines" whether a program's request "involves a change in the device's power state, such as a change from off to on." Araujo ¶25. If not, "then the request may be processed"; if the request requires a change, Araujo determines whether the power policy "allows the device's power state to be changed to service the request." *Id.* It teaches that "various considerations" may be used to determine if a particular program/application's request warrants changing the power state. *Id.* ¶¶25-27, Fig. 2; *see also id.* ¶20. For example, Araujo teaches that applications may be assigned a status "indicating a given program's relative worthiness to receive a power allocation" and that "[w]hether a program is permitted to consume power could be based on a finding as to whether the program's status justifies the consumption of power." *Id.* ¶27.

Araujo discloses that its power policy applies to the end-user device's "wireless network card . . . [and] a request to send data over a wireless network." *Id.* ¶20. Accordingly, if an application requests to send data over the network (an internet service activity) when the network card (modem)'s power state is on, that request will proceed, but "if an application with a low status is requesting use [of] a network card [modem] that is presently turned off . . . the low status application's request may be denied or delayed." *Id.* ¶33; *see also id.* ¶42.

A POSA would have understood that Araujo thus dynamically changes application of the differential traffic control policy based on the power control state changes of a modem. EX-1003 ¶321. If an application's request to send data (internet service activity) requires a change in the modem's power control state, Araujo's power policy allows that request to proceed only under certain conditions. *Id.* If the request does not require a change in the modem's power control state, the request is processed as usual. *Id.* The policy is dynamic because it changes based on the modem's power control state, and it is a traffic control policy because it impacts whether an internet service activity can proceed—if the modem is not allowed to be turned on in response to the application's request to send data over the wireless network (an internet service activity), the activity is denied, and the data packet cannot be sent. *Id.*

A POSA would have been motivated to implement Araujo's power policy as part of the "selectively allow or deny" decision made by the system's processor, *supra* [1.5], [1.6], and a POSA would have expected success for the reasons discussed above, *supra* §VII.A; EX-1003 ¶322.

D. Claim 24: The wireless end-user device of claim 1, wherein the one or more processors are configured to prevent the first one or more applications from changing the power state of at least one of the modems, and to not prevent the second one or more applications from changing the power state of the same modem or modems.

Rao-Montemurro-Freund-Araujo teaches this limitation. As explained, *supra* claim 17, Araujo teaches assigning applications statuses reflecting their power-worthiness, with "VIP" applications being allowed to "consume power in situations where other programs would not be permitted to consume power." Araujo ¶27; *see also id.* ¶4 ("The policy may take into account any factors. One example factor is the identity and status of the program that is requesting action from a device."). Araujo thus teaches assigning a "status" that permits an application to consume a particular amount of power under certain circumstances. *Id.* ¶27.

A POSA would have been motivated to apply Araujo's teachings to Rao-Montemurro-Freund such that the processor assigns the "second one or more applications" (e.g., those an administrator has approved) "VIP" status and assigns the "first one or more applications" lower status. EX-1003 ¶324; Freund, 24:1-9, *supra* [1.4]-[1.6]. A POSA would have understood that as a result, the "second one

or more applications" would not be prevented from consuming the power needed to change the power state of a modem in circumstances where the "first one or more applications" would be barred from consuming that amount of power and accordingly could not change the power state of that same modem. EX-1003 ¶324.

In Rao-Montemurro-Freund-Araujo, the user interface allows the user to augment policy for the first one or more applications, but not the second one or more applications, using the user interface. *Supra* [1.4]. A POSA would have understood that biasing the system towards allowing the second one or more applications to change modem power state in order to communicate requests would therefore be beneficial, because the user cannot adjust a policy applicable to those applications. EX-1003 ¶325.

In contrast, to improve power usage, a POSA would have biased the device towards disallowing the first one or more applications from changing the power state of a modem merely because an application made a request. *Id.* ¶326. A POSA would have understood that the user would have the option to modify the policy as it applies to the first one or more applications and could do so to override the denial if needed. *Id.*; *supra* claims 2-3. Indeed, Araujo teaches that when the power policy determines an application may not change the power state, "a dialog box may be generated on a display [user interface]." Araujo ¶41. It suggests that the dialog box can "inform the person of the request's energy-consumption effect, and of whether the requested

consumption of energy is permitted under the policy," and it explains that it may then "solicit input from the person" in response to this information. *Id.*

A POSA would have accordingly been motivated to configure Rao-Montemurro-Freund-Araujo's processors to prevent the first one or more applications from changing the power state of at least one of the modems, and to not prevent the second one or more applications from changing the power state of the same modem or modems. EX-1003 ¶327. Doing so would have balanced the goals of power saving and ease of user operation, and a POSA would have expected success in implementing Rao-Montemurro-Freund-Araujo in this way in view of the references' teachings. *Id.*

VIII. 35 U.S.C.§ 314

The Board should not deny institution under the *Fintiv* factors based on the Related Matters identified below. That Petitioner Google is not a party to the Related Matters favors institution under all factors, and particularly Factor 5. For all other Petitioners, the statuses of the Related Matters (Factors 1-4) are either neutral or favor institution.

Factor 1 is neutral. Factor 2 favors institution. The first trial in any Related Matter is May 19, 2025. Further the trial date is not determinative, particularly as in EDTX, multiple trials are commonly scheduled on the same date.

Factor 3 favors institution. The first Markman hearing is not until November 19, 2024, and completion of discovery and dispositive motions all follow institution. EX-1021, 4. Petitioners diligently brought this challenge approximately 6 months after receiving contentions for all claims. *CoolIT Sys., Inc. v. Asetek Danmark A/S*, IPR2021-01195, Paper 10 at 11-14 (PTAB Dec. 28, 2021).

Factor 4 favors institution. This Petition challenges all 24 claims, which will likely be greater than the number of claims tried. EX-1020 ¶¶3-4. Moreover, Patent Owner asserts the patent in multiple litigations, and resolving invalidity questions here would mitigate duplicative efforts.

If Factor 6 is considered, the compelling merits of this petition outweigh any concerns that might arise under Factors 1-5. Petitioners rely on prior art that the Office never applied, presents significantly different invalidity grounds, and relies on Dr. Houh's declaration explaining each claim's invalidity.

IX. 35 U.S.C. § 325

These grounds were not previously considered by the Office. None of Montemurro, Freund, or Araujo were before the Examiner.[2] Although a related Rao reference was submitted with over 1,200 prior art references, the Examiner did not

[2] An Araujo patent was before the Examiner, but it was not discussed and, further, it is unrelated to the Araujo publication raised here.

apply or discuss any reference. The claims were allowed in a first office action allowance without substantive comment.

X. MANDATORY NOTICES UNDER 37 C.F.R. § 42.8

A. Real Party-in-Interest

Google LLC,[3], Cellco Partnership d/b/a Verizon Wireless, Verizon Corporate Services Group Inc., T-Mobile USA, Inc., Sprint LLC f/k/a Sprint Corp., AT&T Services, Inc., AT&T Mobility LLC, and AT&T Enterprises LLC[4] are the real parties-in-interest for this petition.[5]

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[3] Google LLC is a subsidiary of XXVI Holdings Inc., which is a subsidiary of Alphabet Inc. XXVI Holdings Inc. and Alphabet Inc. are not real parties-in-interest to this proceeding.

[4] Related-Matter Defendant AT&T Corp. has undergone a corporate transaction and is now merged and converted into AT&T Enterprises, LLC.

[5] Defendant-Petitioners Cellco Partnership d/b/a Verizon Wireless, Verizon Corporate Services Group Inc., T-Mobile USA, Inc., Sprint LLC f/k/a Sprint Corp., and AT&T Services, Inc. also acknowledge that each petitioner has a number of affiliates and state that no unnamed entity is funding, controlling, or otherwise has an opportunity to control or direct this Petition or their participation in any resulting

B. Related Matters

The ’613 patent is, or has been, involved in the following proceedings:

Name	Number	Forum	Filed
Headwater Research LLC v Verizon Communications Inc.	2:23-cv-00352	E.D. Tex.	Jul. 28, 2023
Headwater Research LLC v AT&T Inc.	2:23-cv-00397	E.D. Tex.	Sept. 1, 2023
Headwater Research LLC v AT&T Inc.	2:23-cv-00398[6]	E.D. Tex.	Sept. 1, 2023
Headwater Research LLC v T-Mobile US, Inc.	2:23-cv-00377[7]	E.D. Tex.	Aug. 21, 2023
Headwater Research LLC v T-Mobile US, Inc.	2:23-cv-00379	E.D. Tex.	Aug. 21, 2023

C. Lead and Backup Counsel Information

Petitioners provide the following designation of counsel:

IPR. Defendant-Petitioners Cellco Partnership d/b/a Verizon Wireless, Verizon Corporate Services Group Inc., T-Mobile USA, Inc., Sprint LLC f/k/a Sprint Corp., and AT&T Services, Inc. are also not aware of any affiliate that would be barred from filing this Petition under 35 U.S.C. § 315(e).

[6] The -00398 case has been consolidated with the -00397 case.

[7] The -00377 case has been consolidated with the -00379 case.

Lead Counsel	Back-Up Counsel
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In concurrently filed Powers of Attorney Google LLC has granted Power of Attorney to Practitioners at Finnegan, Henderson, Farabow, Garrett & Dunner, LLP, and Cellco Partnership d/b/a Verizon Wireless, Verizon Corporate Services Group Inc., T-Mobile USA, Inc., Sprint LLC f/k/a Sprint Corp., and AT&T Services, Inc. have granted Power of Attorney to Practitioners at Duane Morris LLP.

Petitioners consent to service by email at the addresses listed above and Headwater-613-IPR@finnegan.com; PDMcPherson@duanemorris.com; and KPAnderson@duanemorris.com.

XI. CONCLUSION

Petitioners respectfully request that the Board grant IPR and find all challenged claims unpatentable.

Dated: June 7, 2024

By: /Erika H. Arner/
Erika H. Arner (Reg. No. 57,540)

CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(a)(1)(i), the undersigned hereby certifies that the foregoing PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 9,215,613 contains 13,581 words, excluding parts of this Petition exempted under § 42.24(a), as measured by the word-processing system used to prepare this paper.

Dated: June 7, 2024

/Daniel C. Tucker/
Daniel C. Tucker (Reg. No. 62,781)
Counsel for Petitioner

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§ 42.6(e) and 42.105(a), the undersigned certifies that on June 7, 2024, a copy of the foregoing **Petition for *Inter Partes* Review**, **the associated powers of attorney**, and **Exhibits 1001-1012, 1014-1015, and 1019-1021** were served by FedEx Priority Overnight on the correspondence address of record indicated in the Patent Office's public Patent Center system for U.S. Patent No. 9,215,613:

Michael Farjami
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Dated: June 7, 2024

By: /William Esper/
William Esper
Case Manager and PTAB Coordinator
Finnegan, Henderson, Farabow,
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